Medical Xpress

Study shows common pain cream could protect heart during attack

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Keith Jones

(PhysOrg.com) -- New research from the University of Cincinnati (UC) shows that a common, over-the-counter pain salve rubbed on the skin during a heart attack could serve as a cardiac-protectant, preventing or reducing damage to the heart while interventions are administered.

These findings are published in the Sept. 14 edition of the journal *Circulation*.

Keith Jones, PhD, a researcher in the department of pharmacology and cell biophysics, and scientists in his lab have found that applying capsaicin to specific skin locations in mice caused sensory nerves in the skin to trigger signals in the nervous system. These signals activate cellular "pro-survival" pathways in the heart which protect the muscle.

Capsaicin is the main component of chili peppers and produces a hot sensation. It is also the active ingredient in several topical medications used for temporary pain relief.

Capsaicin is approved for use by the U.S. Food and Drug Administration.

Jones is working with Neal Weintraub, MD, a UC Health cardiologist and director of UC's cardiovascular diseases division, and other clinicians to construct a translational plan to test capsaicin in a human population.

"Topical capsaicin has no known serious adverse effects and could be easily applied in an ambulance or emergency room setting well in advance of coronary tissue death," Jones says. "If proven effective in humans, this therapy has the potential to reduce injury and/or death in the event of a coronary blockage, thereby reducing the extent and consequences of heart attack."

Researchers observed an 85 percent reduction in cardiac cell death when capsaicin was used.

They also found that a small incision made on the abdomen triggered an 81 percent reduction.

"Both this and the capsaicin effect are shown to work through similar neurological mechanisms," Jones says. "These are the most powerful cardioprotective effects recorded to date.

"This is a form of remote cardioprotection, using a skin stimulus that activates cardioprotection long before the blocked coronary artery is opened."

Weintraub adds that this finding offers an important distinction between existing therapies.

"All of the current interventions require the vessel to be opened before doctors can act, and since it takes time to elicit protection, tissue dies," he says. "This treatment will protect the heart before the vessel is opened while producing a strong protective effect that is already active when we open the vessel."

Jones and Weintraub think that skin—the main sensor and largest human body organ—has evolved to protect animals, including humans, in a variety of ways.

"By activating these sensors in the nervous system, via skin, we think that a response to preserve and protect the heart is triggered," Weintraub says.

"We think that this technique is fooling the body into sending out protective signals," Jones adds. "This may be similar to the way certain acupuncture treatments work; there may be a neurological basis. In a broad sense, this work may provide a 'Rosetta stone' for translating alternative medicine techniques—like acupuncture—to Western medicine. Perhaps we can understand the biological mechanisms of how alternative treatments may be successful for patients."

Now, researchers will further explore this concept by investigating which sensors are associated with certain aspects of organ protection—and how much of specific stimuli are needed to produce the desired responses.

"This could help create favorable outcomes for those who are experiencing stroke, shock or are in need of an organ transplant, and the best part is that it is done non-invasively and is relatively inexpensive," Jones says.

But he warns against rubbing capsaicin on your belly if you feel like you are having a heart attack.

"We don't know if it will work for all indications, for all patients, and we don't know if it will work over an extended amount of time," he says. "A major goal is testing this therapy in clinical trials, but we still need to study more about dosage and application—where we put it on the body for the best results. However, this has tremendous clinical potential and could eventually save lives."

Source: University of Cincinnati